Amendments to the Specification

On page 1, please replace the paragraph starting on line 7 with the following:

B1

This application claims the benefit of priority to US Provisional Application Serial No. 60/220,639, filed July 25, 2000, entitled "Tissue, Monitoring and Characterization Apparatus and Method", which is fully incorporated by reference herein. This application is also related to co-pending ~~application attorney docket number 13724-850~~US Patent Application No. 09/916,235, filed July 25, 2001, which is also fully incorporated by reference herein.

On page 6, please replace the paragraph starting on line 4 with the following:

B2

Figures 4a-4[[c]]d are perspective views illustrating various arrangements of the emitting and detecting members; Figures 4a-4b illustrate[[s]] an embodiment having a centrally positioned a return electrode surrounded by other impedance sensing members; Figure 4[[b]]c illustrates an embodiment having the return electrode eccentrically positioned respect to other impedance sensing members; Figure 4[[c]]d illustrates an embodiment having multiple and independently positionable impedance sensor arrays.

On page 13, please replace the paragraph starting on line 19 with the following:

B3

Referring now to Figures 1 and 2, an embodiment of impedance treatment apparatus 10 comprises an elongated member or introducer 12 having a lumen 13, a proximal portion 14, a distal end 16, one or more resilient members 18 positionable in lumens 13 and one or more impedance sensors 22 disposed on members 18 or impedance sensing members 22m positionable in lumens 72 disposed within members 18. Distal end 16 may be sufficiently sharp to penetrate tissue including fibrous and/or encapsulated tumor masses, bone, cartilage and muscle. Lumens 13 may extend over all or a portion of the length of introducer 12. Members 18 can comprise a plurality 18pl of resilient members 18 configured to be positionable in lumen 13 and advanceable in and out of distal end 16 by an advancement device 15 or advancement member 34 or other means described herein. Resilient members 18 can be deployed with curvature

B3 cont'd

from introducer 12 to collectively define a volume 5av in target tissue site 5'. In an embodiment all, or a portion, of one or more members 18 can be an energy delivery device or energy delivery member 18e described herein. Energy delivery device 18e can be coupled to an energy source or power supply 20 and can also include one or more lumens 72.

On page 19, please replace the paragraph starting on line 9 with the following:

B4

Referring now to Figures 4a-4[[c]]d in various embodiments, impedance sensing members 22m can be arranged in arrays 22a having a variety of geometric arrangements and relationships so as to electrically sample different volumes of tissue 5sv using different conductive pathways 22cp. Such embodiments provide the benefit of improved acquisition, accuracy and analysis of the impedance signal 19p from a given sample volume 5sv to compensate for signal hysteresis, noise (due to energy delivery etc.,) directional bias or other error. They also provide the benefit of simultaneous sampling and comparison of two or more tissue volumes to perform tissue identifications.

On page 19, please replace the paragraph starting on line 18 with the following:

B5

Referring now to Figures 4a-4[[c]]d, conductive pathways 22cp can have a variety of configuration and orientations all selectable by the user. In an embodiment the conductive pathways 22cp can be evenly distributed or spaced within the sample volume 5sv. This can be achieved by either the configuration of the members 22m, through the use of switching device 29 or a combination of both. Alternatively, the conductive pathways can be aligned with respect to one or more sensing members 22m, the introducer or the tumor volume 5" itself. In an embodiment shown in Figure 4a, one member 22mc can be positioned at the center of tissue volume 5sv with other members 22m positioned in a surrounding relationship so excitation current travels in a plurality 22pp of conductive pathways 22cp to and from the center of the sample volume 5sv to the outlying impedance sensor members 22m. In use, this configuration results in an impedance measurement for the sample volume 5sv which is an average of the individual impedance for each conductive pathway providing the benefit of a more a statistically

representative sample of impedance for a selected tissue volume than provided by a
35 cont. single pathway alone. Members 22m can be collectively coupled to a positive terminal of power supply 20 with member 22mc configured as a return electrode and coupled to a return terminal of power supply 20.

On page 20, please replace the paragraph starting on line 6 with the following:

In a related embodiment shown in Figure 4[[b]]c, member 22mc can be eccentrically positioned with respect to members 22m and/or positioned on the periphery of a sample volume defined by members 22m. Again this embodiment provides benefit of an average and thus more representative impedance measurement for the sample volume. However,
36 this configuration also provides the benefit of being able to more readily detect and locate non-uniformities 5nu in impedance and hence tissue properties occurring on the boundaries or otherwise non centered portions of the tissue volume. Use of switching device 29 allows for the dynamic switching of any of the sensing members 22m to a return electrode 22mc to more readily detect the location of a potential non-uniformity within the sample volume by rapidly scanning different portions of the periphery of the volume.

On page 20, please replace the paragraph starting on line 18 with the following:

Alternatively as shown Figure 4[[c]]d, members 22m can comprise a first array 22a1 (such as perpendicular array) and a second array 22a2. First array 22a1 can be rotated to
37 obtain different conductive paths to second array 22a2 so as to sample different tissue volumes and/or provide multiple samplings of the same volume (via different conductive paths) to improve accuracy and precision of the measurement and reduce noise. In use this embodiment also allows detection of incomplete ablation by comparing a measured impedance from a first group of conductive pathways 22cp1 defined by first array 22a1 to a second group of conductive pathways 22cp2 defined by second array 22a2.

On page 26, please replace the paragraph starting on line 26 with the following:

Referring now to Figure[[s 10]] 11, in an embodiment for monitoring the ablative process
38 the impedance signal intensity 19si for a sample volume of tissue bounded by two or

sensing members 22m or array 22a can be monitored over time using monitoring device 19, supply 20 or other bioelectric signal monitoring means known in the art. An endpoint for ablation can be determined based on either a selectable threshold value 19ts of signal 19si or an inflection point or change in slope 19ds (e.g. a derivative) of curve 19p or a combination of both. In an embodiment signal 19p can comprise the subtraction of a baseline (or reference) impedance measurement 19sbl of a nearby, but non-ablated tissue volume, from a real time measurement 19srt of the target tissue volume during the time course of ablation. This compensates for any signal or tissue hysteresis over time. Values for 19ts and 19s can be input and stored in logic resource 19lr coupled to impedance monitoring 19 or incorporated into an electronic algorithm controlling the delivery of energy which can be stored in a controller or processor 338 coupled to power supply 20.

28 cont.